shelters yielded inscriptions and pictographs to the explorer, who considers their style as related to the pictography of the Orinoco and Apure countries. Fragments of pottery, hatchets made of shells and stones are profusely scattered around the ancient encampments of the native Arubans.

The name of *Curaçao* island seems to be the Tupi word coaracy′, curassé, *sun*, in Guarani, quaraçi; *Aruba* resembles the name of a shrub which is called in French Guyana *arube*. Nicolas Fort y Roldan, in his "Cuba *indigena*" (Madrid, 1881), p. 125, gives *arabo* as the name of a plant as heard on one of the Great Antilles.

The Papiamento.—On account of the peculiar selection and association of their ingredients, and the grammatic changes which the terms are undergoing, the jargons or medley languages are now being studied by linguists with the interest they deserve. The best known jargons of America are the conversational Tupi or "lingoa geral," the various negro jargons of Guyana, of the West Indies and of Louisiana, the Chinook jargon, etc.; in the early stages of their formation English, Turkish and Neopersian were jargons also. The main ingredient of Papiamento, which is spoken upon Aruba, Curaçao and the rest of this island group, is the Spanish language; then comes Dutch, the language of the Netherlandish rulers, and least in frequency are the words of Indian origin.

The character of this medley speech will best appear from a Conversational Guide, which has been published at Curaçao, 1876.—*A. S. Gatschet.*

MICROSCOPY AND HISTOLOGY.[1]

MYRTILLUS, A NEW DYE FOR ANIMAL AND VEGETABLE TISSUES.—Dr. M. Lavdowsky[2] recommends the juice of fresh huckleberries, *Vaccinium* (Gaylussacia Gray) *myrtillus*, as an excellent staining medium, especially for the caryokinetic figures and the cellulose walls of plant cells.

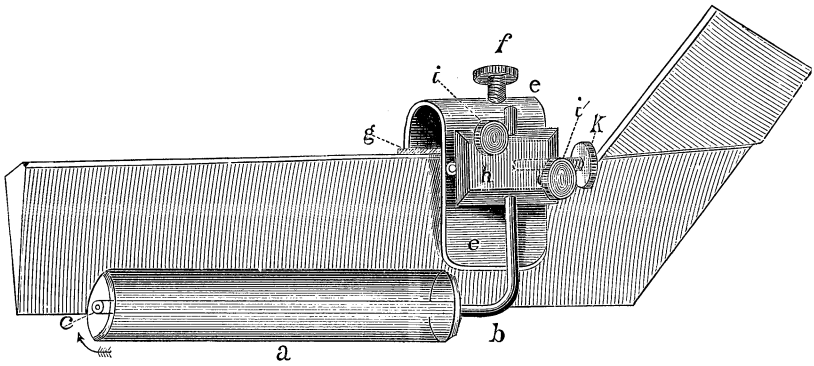
Preparation.—The newly picked berries should be washed in water, then the juice expressed and mixed with twice its volume of distilled water containing a few grams of ninety per cent alcohol. The mixture may next be boiled for a short time, then filtered while it is still warm. The fluid thus obtained is deep red and slightly acid, and may be kept in well corked bottles for a long time, if not left in too warm places. The fluid becomes somewhat thick on cooling, and may therefore be diluted with 2–3 times its volume of distilled water at the time of using.

Two different colors are produced by this fluid: 1. *A red color* is produced by the action of the fluid on fresh objects, *and on objects hardened in chromic acid or other chromic solutions.* The

[1] Edited by Dr. C. O. WHITMAN, Mus. Comp. Zool., Cambridge, Mass.
[2] *Arch. f. Mik. Anat.*, XXIII, pp 506–508.

best staining is said to be obtained from chromic acid preparations. 2. *A lilac color*—more durable than the red—may be obtained in the following manner: Place three watch-glasses on a white ground, fill one with the myrtillus fluid, the second with a one per cent solution of acetate of lead, and the third with distilled water. Place the object in the dye for one or two minutes, wash in the distilled water, then leave in the solution of acetate of lead until the lilac color becomes pronounced; finally wash and mount in glycerine or, after treatment with alcohol, in balsam. In case glycerine be used, a little acetate of lead should be mixed with it.

A NEW SECTION-FLATTENER.—Dr. F. Decker[1] has invented a section-flattener which presents an important improvement on those hitherto described in this journal. The flattener is a cylindrical glass roller (*a*) which rotates on a brass rod (*b*).



The diameter of the rod is 2^{mm}, slightly less than the lumen of the roller, so that the latter rotates easily and evenly.

A steel plate (*e*) bent so that the two arms clasp the blade firmly, forms a carrier for the roller and its shaft. The carrier is slipped on at the free end of the blade, and the pressure of its arms strengthened by means of the screw (*f*), the inner end of which bears against a narrow strip of steel (*g*). To the upper arm of the carrier a brass block (*h*) is attached by means of a hinge which runs lengthwise along the middle of the under side of the block. The short arm of the brass rod (*b*) passes through the middle of the block in a horizontal direction, and is fixed in any position by means of the screw (*k*). The distance of the glass roller from the edge of the knife is regulated by the screws *i* and *i'*. If one of these screws is raised and the other lowered one half of the block (*h*) will be raised and the other half lowered, and the distance between the roller and the blade correspondingly altered. The length of the glass cylinder (*a*) is 5^{cm}, its diameter should vary according to the size of the object to be

[1] Ein neuer Schnittstrecker. *Arch. f. Mik. Anat.*, XXIII, pp. 537–543, 1884.

sectioned. Three cylinders, measuring 4, 6 and 9^{mm} in diameter, will be found sufficient for all ordinary purposes.

The apparatus above described can be adjusted to knives of different microtomes. It may be obtained from Gustav Stöber in Würzburg.

THE DISTOMIAN BROOD-SAC OR SPOROCYST.—Our knowledge of the life-cycle of the digenic trematodes has become nearly complete through the researches of Leuckart, Thomas, Schauinsland and Biehringer. Schauinsland was the first to trace the development of the trematode embryo from the egg; and Leuckart and Thomas nearly completed the story by giving us the history of the liver-fluke through the heteromorphic generations that begin with the embryo and end in the sexually developed fluke. Biehringer's recent paper supplements our knowledge of the sporocyst and its brood in one or two important particulars.[1]

Structure of the sporocyst.—The typical sporocyst is composed of three layers: 1. The outer thin layer, for a long time regarded as a cuticle and sometimes compared to the basal membrane of planarians, is shown by Biehringer to contain nuclei, and hence it must be regarded as a true epidermis, comparable with the *hypodermis* of other worms. Hitherto the ciliated mantle of the embryo, which is thrown off during the transformation into a sporocyst, has been held to represent the entire ectoderm (epidermis), and hence the sporocyst was supposed to be without an ectodermic layer. Biehringer takes a more rational view, holding that the ciliated mantle represents only the outer layer of the ectoderm, comparable to the outer epithelial layer of the larva of an echinoderm or a nemertine. The so-called cuticula of the cercarian larva is also shown to be not a cuticula but an epidermis.

2. Beneath the epidermis there is a thin muscular layer consisting of an outer stratum of transverse (circular) fibers and an inner stratum of longitudinal fibers.

3. The inner layer, which forms the chief part of the wall of the sporocyst, may be called a *germinal epithelium.*

Some sporocysts have a fourth layer enveloping the three just named; but this layer, as was long ago pointed out by Leuckart, forms no part of the proper wall of the sporocyst. Biehringer has for the first time determined the precise origin of this accessory membrane. *It is formed from the blood corpuscles of the host.*

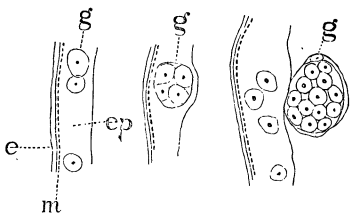
Origin of the Germ-cells of the Sporocyst.—There is a wide difference of opinion between Leuckart and others as to the origin and nature of the cells which give rise to the young brood in the mature sporocyst. The free-swimming distomian embryo is completely filled with coarsely granular cells, which are the direct

[1] Joachim Biehringer. Beitrage zur Anat. u. Entw'gesch. d. Trematoden. *Semper's Arbeiten*, VII, 1884, pp 1-26.

descendants of the cleavage-cells. Leuckart holds that these are the germ-cells of the next generation, and that their number remains the same when the sporocyst stage is reached. Thomas also regards these as germ-cells, but thinks that their number is augmented by germ-cells derived from the epithelial layer which lines the cavity of the sporocyst. According to Leuckart then the germ-cells are ready formed from the outset; but according to Thomas some are ready formed while others have an epithelial origin.

Biehringer has settled definitely that germ-cells do arise in the epithelium, but leaves the question of a two fold origin of germ-cells still open, not having been able to trace the history of the cells which fill the interior of the embryo.

A cell in any portion of the epithelium divides into two cells, the plane of division cutting the axis of the sporocyst at right angles, as in Fig. 1 *g*. Further division gives four, eight cells, &c., ending in the formation of a morula-like mass which escapes from the epithelial layer into the central cavity, and here completes its development. This mode of reproduction is to all appearances asexual, and may be regarded as a process of internal budding. The developmental cycle of the trematode is therefore, according to Biehringer, a true alternation of generations.



FIGS. 1, 2 and 3 show portions of the wall of a sporocyst with epithelial cells (*g*) in different stages of cleavage. *e*, epidermis; *ep*, epithelium; *m*, musculature; *g*, germ-cells developing.

THE DEVELOPMENT OF THE JAWS OF BRANCHIOBDELLA AND A METHOD OF ISOLATING THEM.[1]—The jaws, of which there are two, one dorsal and one ventral, are formed on small papillæ as cuticular secretions. The papillæ represent slightly thickened areas of the epithelium lining the œsophagus. The jaws then are merely thickened portions of the general cuticula which covers the whole of the external surface of the worm as well as the epithelium of the œsophagus.

The five or more denticles on the lateral and posterior edges of the jaw are each the product of a single cell which is slightly longer than the other cells of the papilla.

In order to isolate the jaws and with them the entire cuticular mantle, it is only necessary to leave a Branchiobdella in an empty watch-glass until it has dried, and then cover it with water. The cuticula will expand to its original size, leaving the shrunken animal inclosed as in a sack. The sack can then be cut through the middle and the animal easily removed by slight pressure with the aid of a small brush. The jaws will then be seen cohering with the œsophageal portion of the cuticular sack.

[1] Walter Voigt. *Semper's Arbeiten*, VII, pp. 47 and 54-55, 1884.